Vmich vyeuros

9.

HISTORICAL STEPS
OF
MODERN MEDICINE.

AN ADDRESS

DELIVERED BEFORE THE ST. ANDREWS MEDICAL GRADUATES' ASSOCIATION
AT THE ANNUAL SESSION HELD ON DECEMBER 2, 1871.

BY

HENRY DAY, M.D.,
FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS,
PRESIDENT OF THE ASSOCIATION,
PHYSICIAN TO THE STAFFORD COUNTY INFIRMARY.

MDCCCLXXII.
R. & W. WRIGHT, STAFFORD.

LONDON:
ODELL & IVES, PRINTERS, PRINCES STREET,
CAVENDISH SQUARE.

HISTORICAL STEPS OF MODERN MEDICINE.

THE ANNIVERSARY ADDRESS.

By Henry Day, M.D., F.R.C.P. Lond.

Fellow Graduates and Gentlemen,

If I were to commence this address with an affected indifferenco about, or without some direct reference to, those addresses, or rather those orations—for surely they deserve the latter title—which have annually rivetted your attention at each successive winter session for the past four years, I feel tolerably suro that some who are now present would tax me with being insensible to the many difficulties which beset the task I have undertaken, and to the marked inferiority you will be sure to recognise in my performance of a duty which, I think it must be admitted, the most able, the most eloquent of our Graduates might well be pardoned for commencing with feelings of anxiety, if not with feelings of absolute distrust.

Considering myself fortunate in being placed, by your kindness, in the position of President of our large Association, I nevertheless cannot divest myself of the feeling that I am not *so* fortunate in having to be the immediate successor of a gentleman whose many and great attainments, whose scientific fame and literary reputation, whose powers of oratory and poetry of language, must necessarily overshadow, and render dim by comparison, the feeble effort of one standing so low down on the ladder of medicine as myself; still, whatever my *fear* may be on this account, I do not purpose giving way to despair. I am not altogether without *hope*, and shall regard my condition as being illustrative of the presence of these two conflicting, but dominant, human feelings; whilst in my endeavour to regulate these, I supposo I cannot do better than follow the example set by our greatest poet, (Milton,) who, when recording his senso of hopefulness, says,

> " Where equal poise of Hope and Fear
> " Doth arbitrate the event, my nature is
> " That I incline to Hope rather than Fear,
> " And gladly banish squint suspicion."

Whilst thinking, and doubting as to which and what amongst tho

various and varied themes of medical science would serve as an appropriate subject for the present address, I was bewildered alike by the extent of field from which to cull my material, and by the fact of that same field having had so many gleaners in it, as to leave but little to be gathered for an occasion like the present.

I could have much wished that some subject of original research should have formed my text, but, alas! such gifts as I have, do not lie in the direction of original research, or, if they do, they have been so neglected that now they are grown inactive, and thus this desire fled as it came.

I should have liked, the first thought failing, to have dwelt on some great episode in the past of physic; the analysis of some once favourite theory, or, perhaps, the depicting either of a great epoch, or of a great name in medicine; but unhappily, I live away from the centres of learning, where the literary treasures on which such an effort should be based are stored, and so, once more, the desire was stifled. At last I thought I might, perchance, beguile the hour by giving what seems, to one who lives outside the sphere of prevailing disputations, a simple sketch of the present realities of medical progress.

In every art and science of every age, there are two, if not three phases. There is what may be called the practical phase, pursued by the majority of those who have their interest in the matter, and presenting nothing more, and nothing less, than the current usefulness of the art or science to the masses. There is a second phase, which, expressed poetically, seems to signify some wave of advance, a wave rising high and mightily, and moving as if it would go outward to the sea, but which nevertheless recedes, collapses, is lost, is buried in its own time, and is at once forgotten. There is a third phase, which begins with a gentle ripple, but which increases as it goes on, until, at last, it flows into, and becomes part of, the distant ocean of truth, showing always where it came from, leaving the evidence of its origin behind it, and making the time of its advent a distinct event.

In every age medicine has shown these phases; it shows them now; and the question that has occurred to my mind is, what examples of the last of these phases are, at the present time, recognisable amongst us? If we can define these we shall see, projected as it were into the future, the history which this age will leave be-

hind it, and my effort will be to point out, in a limited manner, what I think will be likely to hold its place and form a part of history: hence the title of this address, *Historical Steps of Modern Medicine.*

In what I have to say under this head, I shall try to skip detail, and keep solely to the idea suggested by the largest courses of advancement; I shall, in like manner, avoid feeble theory, and keep solely to the strongest principles in advance. I shall not leave anything unnoticed *because* it is not yet very prominent, and I shall not, I hope, be drawn into recognising things that are prominent *only* because they are popular and plausible. I shall try simply to represent what, as a steady reader, I have "read, marked, learned, and inwardly digested."

The first foundation in medicine belonging strictly to our own age is *Natural Histology.* Perhaps it is scarcely fair to say it belongs primitively to our age, for Clapton Havers, Meade, Leuenhoeck, the Monros, and many others, were, in a sense, histologists, and some of Monro's plates, forgotten now-a-days, are truly wonderful for their time. But, after all, the progress made was uncertain and irregular, and was too individually isolated to pass into strict science, nor did it lead up to any generalisation, that could be considered a step, until Schwann developed the conception, to use the words of his translator, "that one common principle of development forms the basis for every separate elementary particle of all organised bodies, just as all crystals, notwithstanding the diversity of their figure, are formed according to similar laws." On the foundation of this general principle we have, in the last thirty-five years, accumulated for our successors a series of basic truths, without which, however much their means of instrumental research may improve, they could make no new work, they could found no new principle. I may go even a little further than this, and bestow praise, where it is most worthily due, on those ingenious mechanicians who—standing side by side with us, or following us, or mayhap, anticipating our wants—have brought the science of minute optics to such perfection, that a long time must elapse before any further great advance in the perfection of the instrument, or in results attainable by such perfection, can be accomplished.

It is impossible, at this moment, to recount any special or detailed feature of histology; it will be better, therefore, to speak

of it in its general sense as the newly discovered anatomy of this age; of an anatomy as important, as comprehensive, as that general anatomy which, through the labour of centuries, has descended to us as the basis of our art. For, in brief, as our forefathers were taught, by the general structuro and shape of parts,—that is, the parts as they appeared to the *unaided* vision,—to say this is bone, this is muscle, this is blood, this is nerve; so we, by the new anatomy, and with, as it were, a new sense, are able to say from what, to our predecessors, was invisible matter, this is bone, this is muscle, this is blood, this is nervo, and the like. Again, as they were ablo to preserve and fix their skeletons, and other structures, by which to teach the student, so we are able to preserve and fix our minute tissues, putting a whole museum into a single cabinet for the instruction of those who learn from us. The advance is so great, that a discovery in chemistry which would render the molecules of elements, and molecular construction visible, would only equal it. It is, I think, a firm historical step in modern medicine.

If what I call natural histology be an advance, morbid histology, or, perhaps, more correctly speaking, the histology of morbid tissues, must be placed on a line very little below it. Here again we start a new science running after, and supplementing the older morbid anatomy. Thus, as the older physicians took up a part and said, this is hypertrophied, this is atrophied, this is vascular, this is discoloured, this is too red, too palo, too dark, too light, too heavy, too fluid, or too solid; so we, taking the same parts, speak of them by the minute visible changes they have undergone.

It may be urged, and I believe with some truthfulness, that the fascination of this last named study has held back research in other studies equally, if not more directly, practical; but, after all the error, should it be one, is merely temporary, and the labour represented in it is really so much capital faithfully banked, and ready to be drawn upon when it is required. What, indeed, is now most wanted, is tho application of one or two consummate scholars in histology to condense, arrange, and simplify, all that has been ascertained: this effected, the science of histology of morbid structure would stand as a certain historical step raised by the hands of modern physic.

In parenthesis, as I leave this topic, let me, in a plain practical way, make this further suggestion, namely: that, as in our schools we establish museums in which the student can, at his leisure, compare natural parts and organs with the same organs in a dis-

eased condition, so every school should supply to the student a miniature museum of natural and morbid histological specimens, the whole being so systematically arranged as to show readily the divergence of structure from a natural standard, and to be read off as easily, and as definitely, as from the pages of a book.

There is another advance, having its origin in our time, to which the name of *Animal Dialysis* is applied. It starts from the labours of Dutrochet, and his early observations respecting the passage of fluids through membranes—the lighter, as he thought, into the denser fluid. Year by year this advance has changed and progressed, adding new names to our scientific literature, such as, Exosmosis, Endosmosis, Osmosis. For awhile it dealt only with gravities of liquids, and included the mere idea of motion by attraction of mass in fluids. As it became more studied, it grew in proportion, and took new shape, until, in the hands of Graham, it glided into the contemplation of diffusion, and became connected generally, but not minutely, with the laws of diffusion of other states of matter. At length, and still in the hands of the same illustrious master, the study suggested the grand separation of organic structures and substances into the two divisions of Crystalloids and Colloids—the salts representing the former, the gelatinous and albuminous matters, and their analogues, representing the latter. Still progressing, the relations of water, the neutral steady component of active organic matter, came into consideration in connection with the crystalloidal and colloidal states, and thereupon occurred the discovery that while the colloids pick up water abundantly, the crystalloids fix it, and become carriers of it. And yet a little further, and the transition of similar matter (in heterogeneous combination) from the crystalloidal to the colloidal state, or the reverse, became evident.

The field opened up by these researches is simply as remarkable as it is new: the facts that have been revealed reach from the beginning to the end of part of the phenomena of every living organism. The study of the germ in the ovum suggests at once the thought of dialysis, the study of secretion in glands suggests the same, the study of vascular distribution and of nutrition by blood suggests the same, the consolidation of muscular fibre suggests the same, and so universal is the study, that whenever, in dissection, we come upon membrane, or membranous structure, however web-like or refined, we are brought to dialysis.

I know this development of medicine to be, as yet, in its first stage. I know that if I had the ability to say more about it I should require fresh research to make my observations of interest to those who are listening to me, but I was bound not to let the subject pass without characterising it as a third step in modern medicine, rough, and only partly hewn, but *certain* to remain.

In the past days of our literature we have entertained an endless variety of plans for naming and classifying diseases, with the result of a confusion that is lamentable. This has arisen mainly from the methods that have been taken of studying diseases apart from their causes. The earliest of our philosophers, including all who may be called Hippocratic, were accustomed, in a childish way, to look at each disease, almost exclusively, in relation to its *presumed* cause, paying but little attention to the inner changes that were in progress in the body during the existence of diseased manifestations. In more recent periods, after anatomy began to exist as the root of medicine, and the study of natural structures and functions were engrafted upon it, the tendency manifested itself of making the science of disease a lesson derived from the examination of unnatural conditions of organs and parts. By this plan, the art of naming diseases became separated from the question of cause; hence, we have long classified all our diseases by what we have discovered in the way of departure from natural conditions, asking no word in reference to source, and enquiring very little respecting the phase, or stage of change from a natural state, which the changed structure exemplifies.

Take an example: the anatomists, observing certain changes in the liver, different from natural conditions, have given to one change of disease the name of Cirrhosis. The change established, speculation next follows as to the cause, and slowly it comes out, by evolution, that alcohol is the cause. Or they discover another change of organ—say waxy kidney—and on goes speculation again, by evolution, to trace the cause, but, up to this time, without any satisfactory result; and so I might proceed, naming diseases from their mere structural changes by the dozen, and leaving their causes altogether in obscurity.

A return to the Hippocratic method of study would reverse all this, and by one sweep of test, or experiment, would bring into classes all morbid changes that spring from common causes: it would teach us,

for instance, with regard to alcohol, to determine by extended and definite experiment, every morbid structural change belonging to the influence of alcohol, and so, step by step, it would lead us on from cause to the minutiæ of its effects, until our nomenclature, now expanding and expanding by the addition of every discovered change, (and so admitting of being infinitely varied, in detail, without affecting a single postulate,) would be contracted and contracted until it was brought to as few postulates as there are causes.

In the midst of much that is unsatisfactory in this department of medicine, there is still much hope: hope brightening day by day in respect to our progress, and resting, in a certain sense, on a return to that original method of tracing disease from its first cause, to which reference has been already made. The return alluded to is not being carried out, I know, on the original plan, but the end sought after is the same, and there is this advantage in the method at present adopted, that, although it is new, it does not interfere with the old, but runs, coupled as it were, with the ancient usage of observation, and blends well with it. This new method is called, *The Study of Disease by Synthesis.*

By ancient usage, the disease was, in every case, accepted as though it were, if I may say so, an experiment projected, by nature, out of the knowledge of the physician, but sought after, as to its cause, by an examination of the external conditions under which it occurred.

By modern usage, the experiment of disease is made by the observer; the *synthesis* of disease, as it is said, is practised, and, from a given known cause, suggested by theory, morbid changes are produced, which changes resemble those that take place under what have been before considered as the hidden workings of nature.

Of the results of these synthetical researches the world at large has no knowledge, and the profession, taking it as a body throughout the world, but little knowledge; and indeed, the study of disease by synthesis has been cultivated for so few years there is small reason to wonder it should be so little, so indifferently recognised. There is as yet about it hardly sufficient information to produce a decent volume, and yet how rapidly has it led us toward generalisations in all the directions in which it has been applied.

That Diabetes should be producible, synthetically, by the process of irritating the floor of the fourth ventricle, by the inhalation of carbonic oxide, and by other agencies affecting the nervous centres,

thereby proving the true neurotic origin of this formidablo malady, is one of those rapid strides by direct experiment which could not be accredited had it not actually been done, and which, instead of running counter to the previously recognised, but obscurely understood morbid states of the ailment, runs with them, and explains them, as they were never explained before.

That the disease so long known as Cataract should be synthetically producible by the simple process of charging the circulatory current with an excess of crystalloidal matter; that different forms of cataraet should positively be producible by the action of different crystalloids; that the well known diabetic cataract should be producible by the mere introduction of glucose, the crystalloid which the diabetic patient is throwing off, and that, by placing tho body of the animal, in which the morbid state has bcen generated, in favourable circumstances for recovory, recovery should follow;—that all this should happen, opens up to us a series of truths so startling that one almost hesitates to accept them in full, lest, by some accident of experiment, an error should have been committed.

That Epilepsy, and the chronic Epileptic condition, should be producible by the division, and removal of portions of nerves; that the epileptic seizure, in the prepared animals, should at once be made evident by the disturbance of motion in the peripheral nervous matter, at some givcn point of the surface of the skin; and that the tendency to the produced disease should be transmitted by hereditary descent,—these again are facts so extraordinary that we feel we have yet to wait for a knowledge of the true meaning of nervous lesions; for a knowledge which does not now exist, that is to say, for the discovery of lesions which are not detectable by our present instruments of research,—our chemical tests, our microscopes,—refined as these may be.

That all the conditions of disease once known by the name of Apoplexy, or Apoplectic Convulsion, but now called Uræmia, should be producible by the process of dividing the nerves of the kidney; by separating the vessels of the kidney from the organ; by introducing the nitrogenous product of the kidney—urea—in excess into an animal; or lastly, and most wonderfully of all, by making the nitrogenous substance from inorganic materials out of tho body, and then occasioning the discase by its introduction into the body,—theso are facts certainly not less strange, not less remarkablc, than those which have preceded.

Lct mc wait a moment,—Is not this last series of facts, in one

particular, the strangest and strongest of all? Is not the production of uræmic poisoning by an organic substance *artificially produced*, the first illustration in science of synthetical organic poisoning by a derivative obtainable from the inorganic world?

"Take," says Boerhaave, lecturing in the year 1735, "some very fresh well concocted urine of persons in perfect health, put it presently into a very clean vessel, and with an equable heat of two hundred degrees, evaporate it till you have reduced it to the consistence of fresh cream, and whilst it continues thus hot strain it through a bag, that the tenacious oil may in some measure be retained there, and separated from it; and the more accurately this is done the better. Put a large quantity of this thick inspissated liquor into a tall cylindrical glass vessel, with a paper tied over it, and let it stand quiet in a cool place for the space of a year. By this means, then, you will have a solid, hard, sub-pellucid, brown, saline mass, fixed all about the bottom of the vessel; and over this a thick, black, pinguious liquid, separated and rejected as it were from the concreted salt. Decant this liquor, take out the saline mass, put it into another vessel, pour some very cold water upon it, and shake it about to free it from its oily impurities, which may be done pretty easily, as it will not easily dissolve in cold water. Keep this saline matter under its proper title. If this is dissolved in hot water and strained till the *lixivium* becomes exceedingly limpid, and evaporated to a pellicle in a clean glass vessel, then, if you set it by in a cold place, it will shoot into saline glebes of a particular kind, that are perfectly distinct from every other salt. In their figure and solidity, however, they come pretty near to the crystals of sugar. These are not fœtid, nor alcaline, but very volatile. This is the native salt of urine."

How little thought Boerhaave when, for the first time, he thus described the native salt of urine, how little thought he the day would come when we should separate the same salt from the urine in a few hours, manufacture it in the laboratory if we wish so to do, and produce with it symptoms of disease, which he, at the bed side, had often seen, but dreamed not of as resulting from the action of the native salt that first came through his scientific hand from one of the recesses of nature. Perchance, even now, there are many things as familiar to us, as the native salt of urine was to Boerhaave, producing diseases as definite as uræmia, and altogether unknown to us as factors of the phenomena we define, describe, converse about, treat, and try to cure.

To turn to other discoveries by synthesis:—That, by division of the sympathetic nerve, we should be enabled to produce paralysis of blood vessels, and that, under the paralysis, so produced, we should witness suffusion of blood, rapid radiation of heat from the extended vascular service, exudation and other secondary symptoms, and indeed all those primary effects of heat, pain, redness, and swelling, which the ancients called inflammation,—these are amongst other striking results of modern experiment.

That, by a division of the supply going to a secreting gland, there should be increased flow of secretion, and further, in relation to another system of nerves, (cerebro-spinal nerves,) that there should be, on their division, ulceration of the parts they supply, as in the case of the cornea, followed by cure of the ulceration, upon division of the sympathetic supply to the same part, is an equally great progress.

That division of the sympathetic nervous supply of parts and organs should tend to the results I have named, establishes a synthesis as remarkable as it is practical; but, I think, it is eclipsed by the more recently discovered fact, that similar phenomena may be produced *without* division of the sympathetic, viz: by the impression made on the nervous organism by the vapours of the organic nitrites, especially the amyl-nitrite, the first of the series subjected to physiological study. Let me dwell here a moment in explanation.

The organic nitrites, it has been shown, seem to act almost instantaneously on the nervous system of organic life, reducing the power of that system, and reducing, as a further result, the tension of vessels; thus they cause relaxation of extreme vessels, and lead to almost instant suffusion of vascular surfaces, so that, after inhaling the nitrite of amyl, the face becomes suffused with the deepest crimson blush; thus also they cause intense action of the heart, followed, if their administration be long continued, by paralysis of that organ, by syncope and death; thus also they excite secretion—that is to say, owing to the relaxation of vessels which they produce in the vascular system of the secreting organs, (for instance the kidneys,) they permit an excessive secretion to take place.

Further, and still more singularly, the nitrites produce a series of phenomena identical with well known emotional states, and, in their extreme action, we even recognise the same condition that we perceive in extreme states of perverted emotion, such, emphatically, as we see in hysteria.

Thus the study of these organic bodies has yielded the most fruitful synthetical results: it has shown that the inhalation of what might seem an almost inappreciable quantity of an organic body will paralyse the ultimate muscular system, set free the heart to renewed action, loosen secretion, disturb cerebral function, and relax muscle to the extremest degree,—in a word, induce all those conditions of disease which lead to what we are accustomed to call "collapse."

That the inhalation of "ozone" should produce catarrh, and, carried to any great length, should lead to pulmonary congestion, and even pneumonia, is another illustration of synthetical work, interesting, if in no other respect, in this, that it shows the direct action of some common and widely spread natural agents, to which we are day by day subjected, upon the peripheral nervous surface.

That the inhalation of dry oxygen at a high temperature, should produce separation of the fibrine of the blood within the bodies of the carnivora, is, once more, a synthetic fact of modern development, throwing great light on the changes which occur in blood during periods, and conditions, when the temperature of that fluid is preternaturally high. How it correlates with the fact, that an increment of twelve degrees of heat in an animal leads to rigidity of muscle, coagulation of fibrine, and rapid death, (another line of synthesis, bearing on febrile conditions I had almost said,) I need not wait to tell, though I could not very well omit the allusion.

That the laborious researches of medical helminthologists should have shown to us how by the administration of an entozootic organism to a living animal, a new development should follow: that Cysticercus from one animal should pass into Tænia in another, and Tænia from one animal into Cœnurus in another; that these things should happen, and be made so plain as to come under the positive rule of science, is a scarcely less encouraging advance than any of the other advances to which I have ventured to direct your attention.

Lastly, before I leave the synthetical method, I must refer to the synthesis of Endocarditis by the introduction of an organic acid (lactic) into the circulation of a healthy animal. It was originally thought that thus experimental research illustrated the cause of acute rheumatic affections; it was never claimed to do so by its author, and later enquiry has unquestionably, I think, put the origin of rheumatism back to a point of time preceding the for-

mation of abnormal acid products, and has shown that such products are secondary, that is to say, are the results of the preexisting systemic derangement.

I have endeavoured to show, in another place, that acute rheumatism is a true neurotic disorder, having its origin in a morbid impression made on the peripheral cutaneous nervous expanse, which, reflected to the cord, leads to all the subsequent symptoms, including the formation of abnormal products. Continued observations support this view, and none better than a fact I have lately ascertained, namely, that between twenty and thirty athletic men were rendered subject to acute rheumatism by being exposed to cold and friction, applied to the surface of their bodies.

The lactic acid synthesis of acute rheumatism must then, in my opinion, be set aside, but not so in regard to that sequel of rheumatism, endocardial inflammation: on this point the synthesis established has been so certain, that the endocardial murmurs have been produced, the inflammatory states of the membrane have been traced through all their stages, and the chronic effects followed out to the end. Thus we are left by the means of a synthesis, as beautiful as any of the before-mentioned examples, with the information that a product of the primary derangement, called Rheumatism, may, by a known means, excite the secondary derangement, called Endocarditis.

In the present era many advances have been made in the methods of diagnosis, and although no single method can be considered great, in comparison I mean with such a grand discovery as auscultation, yet, in the combination of several methods, we have a sum total of advancement that will probably look well in the next page and stage of history.

The first and most important of these means is the *Thermometrical;* the application of the thermometer to the detection of some obscure forms of disease: but the usefulness of this instrument does not stop here, for, whilst diagnosis is the means by which we are able to arrive at our prognosis, the thermometer is of immense service in guiding us in respect to prognosis. To me this point has been matter of study for several years, and I know of no enquiry that has afforded more positive answerings. Is one in doubt as to the premonitory stage of tubercle? does physical examination by the stethoscope give an equivocal reply?—there is the thermometer

by which to solve the difficulty. Does one, after a case of "shock," or "surgical operation," wish to know the earliest indication of real danger ?—there is the thermometer to tell us that the danger is imminent, or even that it must be fatal. Do we meet with deceptive symptoms of fever ? — again the thermometer is our guide.

A man is brought into the General Infirmary at Stafford to be under my care, and there have been periods when he seemed so well, before I saw him. that he was considered to be in no kind of danger ; but then I find, on enquiry, that there have been other periods of his illness when there has been what is called "high fever," followed by intense depression. A case, you may say, of relapsing fever. Yes! I learn that on two occasions he has had an elevation of temperature during the day up to $105\frac{2}{5}$ Fahr. ; on another occasion, he had a second rise of temperature on the same day, and the mercury then stood at $107\frac{1}{5}$ Fahr. On the thirty-third day of his illness, the morning temperature was 96 ; rising to $103\frac{1}{5}$ at two p.m. ; and falling again at five p.m. to 100 ; at eleven p.m. the thermometer marked 106 : and altogether the instrument gave a series of such ugly variations that my experience told me I must augur the worst, as there is, as yet, no known remedy with which cases showing these extreme variations of temperature can be met. Unhappily, the thermometer told but too truly, for the man died.

Take another case—a young woman is brought into the same institution labouring under well marked enteric fever, with a morning temperature *persistently* higher than the evening temperature : again my experience bids me pronounce unfavourably as to the termination of the case, and again the truthful thermometer is correct—the poor patient dies.

I could multiply and multiply these experiences of the uses of the thermometer in disease, but the labour is unnecessary, for they are your experiences as well as mine.

I am fully prepared to admit that an undue importance has been given to the *Laryngoscope*, not to it as an aid to a particular diagnosis, but as a general sign of advance in scientific medicine. I am not therefore, going to extol this instrument as if it were an instauration, or, indeed, anything more than a clever use of a reflector—an extension of a practice that has long been known to, and carried on by, the dentists, as well as in various kinds of physical experiments. On the contrary, I can but feel that medicine everywhere

showed an unnecessary weakness in the appreciation of first principles of advancement, when she lent herself, so urgently and wonderingly, as she did a few years ago, to anything so essentially small. At the same time, to be quite fair, the diagnosis brought out by the laryngoscope has served some useful purposes. For the discovery of foreign substances lodged in the upper part of the air passages, for the detection of morbid growths in the same parts, of morbid conditions of the vocal cords, and of ulceration of the glottis, the laryngoscope supplies us with an instrument which, now that we have it, we could not conveniently spare.

The *Ophthalmoscope*, really an instrument of our own time, stands in a much higher rank of discovery as a means of diagnosis. The instrument, simple as it is, is, I mean, the product of a higher physical induction, and the results of its employment lead to a deeper insight into internal changes of structure. The ophthalmoscope pierces beyond the retina, though it illuminates that nervous expansion only, for, by inferential teaching, it reveals to us the inner vascular changes, and changes of nervous matter in the cerebral centres themselves. Briefly, this instrument, commenced for the special purpose of enabling the ophthalmic surgeon to recognise the structural diseases within the globe of the eye, has become now of so wide an application in the hands of the general physician, that it promises to rank, as an instrument, next only to the stethoscope in physical diagnosis.

Just as an illustrative case I may mention the following. A man was admitted as an in-patient at the Stafford Infirmary under my care: he complained of continued, and sometimes very severe, pain at the left side of his head. His general health appeared good. He had had syphilis. For many months he had been treated for neuralgia (tic), and had swallowed no inconsiderable amount of iron and quinine. An ophthalmoscopic examination of the left eye showed white optic atrophy, with considerable cupping of the disc; vision was very imperfect, although, strangely enough, he was not aware of this until the examination was being made. The diagnosis arrived at was tumour in the left side of tho brain, probably in the neighbourhood of the optic tract. After being in the Infirmary nearly three months, the sight of the left eye having been quite lost, he died in a fit whilst in bed. The post-mortem examination revealed a gummy tumour completely obliterating the left middle cerebral artery, accompanied with softening of the *entire* left cerebral hemisphere. Thus much for the ophthalmoscope.

An instrument of our time, now very much neglected, except at quiet corners of great metropolitan thoroughfares, where it may be tried for a penny, is the *Spirometer*, invented by the late Dr. Hutchinson. This instrument, as a measurer of vital capacity, and as a by no means indifferent measurer of vital power, has passed, I think, into disuse without deserving the neglect. It is a good instrument; too clumsy, I doubt not, in construction, and, in this respect, unpopular, but most valuable when correctly employed. Like the thermometer it is a most important aid in the discovery of tubercle in doubtful cases. It affords the most telling record of the amount of pulmonary damage in cases of emphysema, and it has developed some singular physiological facts which have yet to be properly worked out: one specially; that capacity of respiration is greater in tall than it is in short persons, although, in the latter, the circumference of the chest may be relatively larger.

The *Sphygmograph*, introduced amongst us in recent years, has yielded readings infinitely curious, if not, as yet, peculiarly practical. Its application, generally, is limited by its complexity, and, if I may be so bold as to say it, it gives us what we do not always want, and it does not give us what we always do want. If it could be simplified in construction, and could be so arranged that it would register for us the precise number of strokes of the pulse per quarter minute, together with the exact power, or force, of the pulse, so that from visit to visit we could be accurately taught on these two points, we should have an aid of great value. But it may be, that, as it is, some leading discoveries have to be made with it for the benefit of the working practitioner. For these we must wait.

Electricity, as an aid to diagnosis, is one of the latter day improvements to which I need to direct attention. The use of the minor telegraphic arrangement for the detection of metallic substances in gun-shot wounds; the use of the metallic brush and dry conductor for testing degrees of sensibility of the surface of the body; of the interrupted current for proving the continuance of muscular contractility; the employment of moist conductors for determining the relative failure of particular muscles in paralysis, —these are advances, simple, but ready to hand, and often satisfactory in the lessons they teach.

Lastly, there is the most recent improvement in the art of diagnosis, the application of *Ether Spray* for testing the vascular tension of parts of the body, or of the body as a whole. We try by this method, what resistance the nervous surface can offer to an

extreme degree of cold suddenly applied, and we find in proportion to the feebleness of resistance the rapidity of the action of the cold as shown by freezing of the part. It has in this way been shown in a case of paralysis, that, whereas in the healthy parts of the subject a resistance of nine seconds was offered, in the paralysed parts the resistance was overcome in two seconds. Here we have a new instrument of diagnosis; so new that we all have to learn its utility.

These aids are all historical steps in our medicine of to-day; they are little steps, but distinct, and, unless they become overshadowed by some new and grand generalisation in diagnosis, will stand out demanding recognition and receiving continued improvement.

They are faithful indices of the age altogether, of an age weak in grandeur of conception of natural things, but strong by, and through, its mastery of many minor ingenious contrivances, which massed together bespeak power as

"Sands make the mountains,
"Moments make the years,
"And trifles, Life."

Every epoch in physic is marked by some great achievement in surgery: for surgical art is so purely experimental, and progresses so steadily from one point of venture to another more daring point, that it must move on independently of theory, or even of physiological discovery. Thus, one age introduces the ligature for bleeding vessels, another introduces transfusion of blood, another the process of cutting for cataract, another the tying an artery for aneurism, and so on. As a rule, a single age, nay a century, has developed but one grand surgical advance, one historical step in surgery; our age in this respect has been much more favoured.

In our time we have had unfolded to us the whole art, the whole practice, of *Subcutaneous Surgical Operation*, the same culminating, at last, in the subcutaneous division of the neck of the femur. It would be difficult to over-estimate this branch of progress, about which no fault hangs, greater than its artificial and needless separation from general surgery, a separation happily not likely to last long: it is one of the most positive improvements in a mere mechanical point of view, and it is an improvement which teaches beyond its own immediate sphere.

I remember once that at a medical meeting at Chester, when a debate on pyæmia, and other sequences and consequences of surgical operations, was going on, I asked the members of that large meeting whether any one of them had ever heard of pyæmia following upon a subcutaneous operation? The answer, on every side, was an emphatic "*No.*" I observe, moreover, lately that the same negative position is steadfastly maintained. In this truth alone, how instructive a lesson lies open to view, I need not say; and I could cull other lessons from the same source; but I must pursue a new path.

The operation of *Excision of Joints* is a surgical feature of our time. That it met, at first, with much opposition from those who take the lead in the surgical art, is but what ought to be expected of men, who, holding in trust that which has been proved to be good, are jealous about resigning such trust until something better is demonstrated. In the case of excision, the balance of opinion is in favour of the operation, and of certain simplifications of it which promise well: I refer particularly to the simplification which consists in merely cutting down upon the diseased bone by free incisions, and in permitting exfoliation of dead osseous structure, and healing by granulation.

The operation of *Iridectomy*, devised by one of the finest surgeons this century has produced and lost, may be considered a true advance in surgery, accomplishing for the subject of glaucoma that which extraction, or depression of the lens, has done for the subject of cataract. I am reminded that in saying *so* much, I may be saying *too* much for iridectomy; for I am aware that while all are agreed in favour of the operation for cataract, there are some who are not agreed in favour of the other operation—who do not see the principle by which it effects good, and who, indeed, do not even admit the good it is assumed to effect. But after all, from the evidence on both sides, no impartial looker-on can, I imagine, doubt that the verdict is in favour of the operation, and, if such be the fact, the proceeding, even if it should prove but partly true, will rank as being memorable of our time.

The operation for the *Cure of Recto-Vaginal Fistula*, and of *Perineal Rupture*, is an achievement worthy of distinct historical notice. It has required none of the elements of genius to promote it, it falls back for this element on him whom Butler eulogises—

> " So learned Tagliacozzius from
> " The brawny part of porter's bum,

"Cut supplemental noses which
"Would last as long as parent breech;
"But when the race of Nock was out,
"Off dropt the sympathetic snout."

But still it has brought out so many points of surgical skill, neatness, perseverance, and last of all, *success*, that it ranks but little under a work of genius. Most encouragingly it has saved many of the weaker part of humanity from long leases of severe and unremitting pain, and has offered a radical cure for an accident which so long as women bring forth children, will, in a certain per cent. be sure to attend that vital process.

Together with this plastic method we may consider, as kindred to it, the method of *Skin-Grafting*; another modification of the instauration of Gaspard Tagliacozzius. In this matter of skin-grafting there has not yet been sufficient time for observation to allow of a definite answer as to its value, and so I leave it *sub judice*.

The *Treatment of Aneurism by Compression* of the vessel supplying the aneurism, above the tumour, while it fails to be great because, after all, it is but an alteration of Hunter's invention of tying the vessel, marks, nevertheless, an improvement in mechanical art; and, when it can be well carried out, signifies an endeavour to save the patient from the danger that always attends the laying open, by the knife, of the living tissues. It confers credit, therefore, if not lustre, on our age.

The revival of the old system of *Treating Wounds by Excluding the Wounded Surface from the Air*, and by employing, as a dressing, some preserving or antiseptic substance, has been a very useful step, but a step hewn, or attempted to be hewn, with little regard to scientific precision. The plummet and the square, to speak figuratively, have been sadly ignored, while the surface of shirt-sleeve exhibited by our workmen has shown that in the work there has been sufficient *will*, with insufficient superintendence: the ambition spiritual, the reward dust. The result has been, and naturally so, a Babel, breaking up now in perfect confusion, with the workers so unintelligible to each other, that even those who call out a simple word such as "germs," are not understood by others who call out the selfsame term. I have a sort of notion, however, a step will yet be made in this age which will do credit to our knowledge of treating wounds; that some clear mind will come ultimately to clinch the work and reduce to order what is now wantonly irregular: I name the

subject therefore as being, like some others, one of hope, rather than the realisation of a fact accomplished and bequeathed to those who may follow us.

As, for a postcript, the lover cherishes his choicest words of admiration or trust, so, under the section of surgery I retain to the last a reference to the prime surgical work of this era: I mean the advance made in the introduction of *Ovariotomy* as a surgical cure. That out of a hundred women, who thirty years ago would have died had they suffered from the disease known as ovarian dropsy, seventy should now be saveable by the interposition of the art of the surgeon, is a triumph unmistakably grand. Let us assume that the operation shall not last!—let us assume that in the progress of physiological science, some simpler cure than that of laying open the abdominal cavity and removing the ovarian cyst, and firing the pedicle of the cyst, shall be discovered!—that discovery itself will not conceal the greatness of the operation I name. For, to prove, as it has proved, how the viscera of the abdomen may, *in extremis*, be exposed and explored, is, in itself, a sufficient event to fix the attention of the after ages. Meantime too, while we wait for new light, we have the practical results of the operation for our *own* satisfaction, and for our warrant to the wiser men, the magisters of the future, that the intrepid skill of our surgeons, who perfected this operation, was guided by the steadiest principles of art. It is to all of us, their fellow-workers, an honour, to them a pure, an enduring fame.

Let me, herewith, pass from the field of surgery of our time. The workers in it have left two relics at least—namely, subcutaneous incision and ovariotomy—that shall be long remembered, and shall wear enduringly, as historical steps of modern physic.

One other subject relating to the work of our time has yet to be considered. It is the greatest work of all, the most universal in its application, the most difficult in its advancement, the most useful in its perfection. You will anticipate me in thought 'ere I name this work as the science of *Therapeutics*. Such scope is there for observation in this field, I am embarrassed with the richness of the prospect.

The old methods of research, the old methods of practice, in the therapeutical department, are all fast dying out, and what was once obscurity in fact, and symbolism in appearance, is being supplemented

by clearness of conception and reality of presentation. Chemistry to this part of our art lends her magic aid; physics supplement chemistry; and physiology brings into action both these powerful allies: thus our therapeutical work is passing into the phase of positive science so quickly, it is hard to keep level with its posts of advancement.

Three remarkable progressions seem to my mind to distinguish modern therapeutics. The first consists in the study of the action of medicines by the investigation of the physical characteristics of each medicinal substance; the second consists in distinguishing the special action of different remedial substances on particular parts of the living organism; and the third consists in bringing the art of prescribing to the utmost simplicity, so that when we prescribe we know precisely on what we wish to rely for the good we would secure.

All these methods of improvement hang, it will be seen, closely together, and yet they are often distinctly pursued, pursued not only by different men, but by men of diverse modes of thought. They are all good and productive of the best influences. It would be incredible to our forefathers to hear that we have men now, who,—if you give them a chemical substance and tell them, This substance is composed of the following elements, it is of this specific weight, it is of this reaction, it is of this solubility, and it has certain other physical qualities therewith named,—will tell you, in return, with an absolutely near approximation to the truth, what will be the physiological action of the said substance. Yet this is an accomplished fact, and, in the matter of those agents we employ to relieve pain, it has been one of the most fruitful means of the development of the triumph of human art over human suffering; a development belonging truly to the whole Christian era, but most to this latter-day section of that marvellous testimony of "the ways of God to man."

Equally strange would it be to our forefathers to hear that we can now predict where a medicine shall, to speak plainly, go into the organism, and on what it shall act. Yet, in the case of some of our most potent agents, such as arsenic, nitrite of amyl, woorali, we know, when we give them, what will be the seat in which their influence or force will be expended, as well as the nature or quality of that influence.

Finally, to the most distinguished of the older prescribers how strange would it seem to tell them, We give up that long list of

agents that constituted your favourite formulæ; we are content to try one agent at one time; and as to your method of putting your medicines into the body by the stomach only, we in our day, wise as serpents and gentle as doves, put them in by the skin if we like, with a sharp tooth, or instil them in vapour by the lungs so subtly, that the administration is all but unperceived. Yet this too is daily done, and with a successful result undreamed of by the earlier pilgrims of medical progress, and certain amongst the historical steps of our time to remain.

I close my task. If any out-door friend asks of me, and many do ask, What do you of legitimate medicine more than homœopaths, or other schismatics, to advance medical science and medical art? I point such friends, as I point you, my colleagues, to the deeds of medicine I have related so feebly, so imperfectly, to-day. I ask, in my turn, Where would modern medicine have been if these things had *not* been achieved? and I affirm, honestly, that those who have achieved them, *and none other*, are the legitimate professors of the science and the art. To them I bow and declare renewed allegiance.

A word more. As I have travelled rapidly over much ground in the past hour, and mentioned many labours, I have named, you will have observed, not one solitary labourer. Why should I by name, name one? Fast as I passed from topic to topic, you recognised in every labour, the labourer, and so I spoke of them all in richer words than their names,—I mean, in their works, and "*their works do follow them.*" Happy am I in this knowledge, and so far only shall I crave to be exceptional in my admiration, that amongst those over whom I now preside,—and who have, during my year of office, shown me indulgence I can never repay, and honour I can never forget,—are some of the most earnest labourers at the historical steps of modern medicine. That every future President may be able to refer to them proudly, as I do now, to the continued lustre of our "Alma Mater," is my last thought as I thank you for the kindness with which you have received my shadowy picture. I say shadowy picture, and so must it be; for, in relation to the future of earth, or beyond earth, we who live "*see through a glass darkly, but in time we shall know, even as we are known.*"